UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,866	07/06/2006	Bruno Jahan	T69.12-0002	5110

27367 7590 05/21/2010
WESTMAN CHAMPLIN & KELLY, P.A.
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402

EXAMINER	
SHAH, TANMAY K	

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
05/21/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/564,866	JAHAN ET AL.	
	Examiner	Art Unit	
	TANMAY K. SHAH	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 January 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15 and 17-28* is/are pending in the application.

4a) Of the above claim(s) *15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15 and 17-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This communication is in response to the Supplement Amendment to application 10/564,866 filed on 1/14/10.

Response to Arguments

Drawings

2. Corrected drawing has been received and accepted. The objection has been withdrawn.

Abstract

3. Corrected abstract has been received and accepted. The objection has been withdrawn.

4. Applicant's arguments filed on 9/14/10 have been fully considered but they are not persuasive.

5. Applicant amends independent claims 15 and 27 to include features that the obtaining a first estimate of the said propagation channel, by time/frequency interpolation on the said extracted reference signals, and the correction step including a step to calculate an amplitude and phase error vector for each of the said reference pilots.

Applicant argues that the amended features is not taught by Eilts et al. (US 2003/0108127).

In response to above-mentioned arguments, applicant's interpretation of the applied reference has been considered. However, the applied reference teaches limitations of argued matter.

6. First, summary of invention discloses the channel responses at the data tone frequencies can be interpolated from the known responses at the training tone frequencies. This process is called channel estimation. The measured and interpolated channel responses, known as channel estimates (page 1, paragraph 8). So, in order to measure the estimate it does frequency interpolation as described above.

7. Second, regarding to the phase and amplitude error vector, Applicant admits Eilts teaches phase noise but does not include amplitude. Examiner disagrees, Eilts teaches which is transmitted at reduced amplitude, is re-scaled to proper amplitude at step 33 (page 2, paragraph 12). In order to re-scaled to proper amplitude it has to be measured. So, it teaches the argued limitation.

8. Regarding claim 20, it was rejected as being independent claim. Now, in view of the amendments to the claims it is depend upon independent claim 15, and which is also amended, so claim 20 is rejected under new ground of rejection. Please refer to detailed action below.

9. Regarding claim 26, applicant argues that the combination of Eilts and Fujii does not disclose or suggest a phase error detection common to two cells, buy only points out the presence of interferences between many cells.

In response to above-mentioned arguments, applicant's interpretation of the applied reference has been considered. However, the applied reference teaches limitations of argued matter.

Fujii teaches an environment in which identical channel interference is also received from other cells, as in OFDM-CDMA, the known signal also is influenced by

identical channel interference and a problem which arises is a decline in phase-error detection precision ascribable to carrier frequency offset, page 7, col 1 – 7. So, it finds the identical or common error between two cells.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 15 – 19, 21 – 25, 27 - 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Eilts et al. (US 20030108127).

Regarding claim 15, Process for estimating a propagation channel formed by successive symbols of a multi-carrier signal each comprising at least one reference pilot and a plurality of frequencies carrying data (**i.e. OFDM, The OFDM technique sends many carriers in parallel on adjacent frequencies within a frequency band. The frequencies are variously called frequency "bins", tones, or subbands. Tones is the term used in the following description, page 1, paragraph 2**), the process comprising:

extracting the said at least one reference pilot present in each of the said symbols (**i.e. Fig. 3 block 41 extracting the training (also called pilot) tones**

H.sub.TT(k) from the set of all tones H, it is doing it for all k, so it is doing it for each of symbol in the signal, page 3, paragraph 41, summary of invention discloses the channel responses at the data tone frequencies can be interpolated from the known responses at the training tone frequencies. This process is called channel estimation. The measured and interpolated channel responses, known as channel estimates (page 1, paragraph 8));

obtaining a first estimate of the said propagation channel, by time/frequency interpolation on the said extracted reference pilot (**i.e. Fig. 3 block 44, an inverse fast Fourier transform (IFFT) on the training tones is performed to obtain the channel impulse response or channel estimate, page 3, paragraph 41**);

independent correcting the said reference pilot, in phase and amplitude, and as a function of the said first estimate, to output pilots with phase and amplitude correction, said correction step including a step to calculate an amplitude and phase error vector for each of the said reference pilots; (**i.e. block 47 of Fig. 3, it estimates and corrects phase and amplitude, described page 3, paragraph 42 and 43, also the edge tone, which is transmitted at reduced amplitude, is re-scaled to proper amplitude at step 43, so it is correcting amplitude, it is done in separate (or independently) block as shown in fig. 3, which is transmitted at reduced amplitude, is re-scaled to proper amplitude at step 33 (page 2, paragraph 12). In order to re-scaled to proper amplitude it has to be measured)**

obtaining a second estimate of the said propagation channel, by analysis of the said corrected output pilot (**i.e. block 49 of Fig. 3, h'.sub.avg is the phase corrected average. The average impulse response is then zero padded (block 48) using h'.sub.avg and an N-point FFT is performed at block 49 to produce the final channel estimate, page 3, paragraph 44**).

Regarding claim 16, Process for estimating a propagation channel according to claim 15, wherein the said correction step includes a step to calculate an amplitude and phase error vector for each of the said reference pilots (i.e. **i.e. block 47 of Fig. 3, it estimates and corrects phase and amplitude, as described it first estimates or finds error as described in page 3, paragraph 42 and 43**)).

Regarding claim 17, Process for estimating a propagation channel according to claim 16, wherein the said error vector calculation step includes averaging of a set of error vectors obtained on at least one symbol (**i.e. block 47 of Fig. 3 all of the current impulse response samples h(n) have been phase shifted due to the phase noise, but the average impulse response h.sub.avg (n) has near zero phase shift. To estimate the difference in phase between the current impulse response and the average impulse response, so it averages the error vectors, page 3, paragraph 42**).

Regarding claim 18, Process for estimating a propagation channel according to claim 17, wherein the said averaging is calculated on each symbol (**i.e. as shown in block 47, it averages from 0, 1 .... N_{TT}-1, so it does it for every symbol, page 3, paragraph 43**).

Regarding claim 19, Process for estimating a propagation channel according to claim 17, wherein the said set of error vectors only includes error vectors that satisfy at least one predetermined quality criterion (**i.e. applicant does not specifically disclose what the quality criterion is, examiner interprets it broadly as received signal angle, block 47 estimates error and corrects it, for that it uses angle of received signal, so examiner considers received angle is a quality criterion, Fig. 3, block 47, page 3, paragraph 42**).

Regarding claim 21, Process for estimating a propagation channel according to claim 15, wherein the said second estimate includes an equalization step that depends on the first estimate (**i.e. Fig. 3 block 43 which is transmitted at reduced amplitude, is re-scaled to proper amplitude at step 43, which is depend on the first estimate, page 3, paragraph 41**).

Regarding claim 22, Process for estimating a propagation channel according to claim 21, wherein the said equalization step is performed on all carrier frequencies of each of the said symbols (**i.e. it is done for 0, 1 .... N_{TT}-1, so it does it for every symbol, so it does it for every symbol, page 3, paragraph 43**).

Regarding claim 23, Process for estimating a propagation channel according to claim 21, wherein the process comprises a step after the said equalisation step to calculate a pulse response ((**i.e. impulse response, block 47 of Fig. 3 all of the current impulse response samples h(n) have been phase shifted due to the phase noise, but the average impulse response h.sub.avg (n) has near zero phase shift. To estimate the difference in phase between the current impulse response and the average impulse response, so it averages the error vectors, page 3, paragraph 42**) of the propagation channel as a function of the at least one reference pilot equalized by the equalization step, for refining synchronisation of receivers in time (**Fig. 3 block 43 which is transmitted at reduced amplitude, is re-scaled to proper amplitude at step 43, which is depend on the first estimate, page 3, paragraph 41**).

Regarding claim 24, Process for estimating a propagation channel according to claim 15, wherein the said the reference pilot correction step includes a division of these pilots by the first estimate (**i.e. block 47 of Fig. 3 all of the current impulse response samples h(n) have been phase shifted due to the phase noise, but the average impulse response h.sub.avg (n) has near zero phase shift. To estimate the difference in phase between the current impulse response and the average impulse response, so it averages the error vectors and since average is adding all and divide by the total number so it does divide them with first estimate, page 3, paragraph 42**).

Regarding claim 25, Process for estimating a propagation channel according to claim 17, wherein the said correction step of the at least one reference pilote also includes a final step to correct all equalised useful carriers taking account of an average value obtained as a result of the said averaging (**i.e. block 49 of Fig. 3, the average impulse response is then zero padded (block 48) using h'.sub.avg and an N-point FFT is performed at block 49 to produce the final channel estimate, which does take averaging value of block 46 and 48, page 3, paragraph 44**).

Regarding claim 27, there are substantially same limitations as claim 15, thus the same rejection is applicable.

Regarding claim 28, there are substantially same limitations as claim 15, thus the same rejection is applicable.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eltis et al. (US 20030108127) in further view of Zhang (US 2003/0112265).

Regarding claim 20, Eltis discloses process for estimating a propagation channel according claim 16, however does not specifically disclose preliminary step in which the said pilots with an amplitude less than a first predetermined minimum average threshold and/or greater than a second predetermined maximum average threshold are rejected.

Balaban discloses preliminary step in which the said pilots with an amplitude less than a first predetermined minimum average threshold and/or greater than a second predetermined maximum average threshold are rejected (**i.e. the predetermined minimum energy threshold 136 therefore only rejects some of the non-speech audio in this example, page 3, paragraph 113**).

It would have been obvious to one of the ordinary skilled in the art at the time the invention was made to combine the teachings of Eltis with Balaban. One would be motivated to combine these teachings because in doing so it will provide the presence of absence of a valid signal needed in the system.

8. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eltis et al. (US 20030108127) in further view of Fujji et al. (EP 1542384).

Regarding claim 26, Eltis teaches Process for estimating a propagation channel according to claim 15, However does not specifically disclose further comprising using the process for correction of at least one phase and/or amplitude error common to two cells in a same OFDM Orthogonal Frequency Division Multiplex) type symbol.

Fujji teaches using the process for correction of at least one phase and/or amplitude error common to two cells in a same OFDM Orthogonal Frequency Division Multiplex) type symbol (**Consequently, in an environment in which identical channel interference is also received from other cells, as in OFDM-CDMA, the known signal also is influenced by identical channel interference and a problem which arises is a decline in phase -error detection precision ascribable to carrier frequency offset, page 7, col 1 - 7**).

It would have been obvious to one of the ordinary skilled in the art at the time the invention was made to combine the teachings of Eltis with Fujji. One would be

motivated to combine these teachings because in doing so it will provide estimation error in each cell and can correct the error in each cell.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TANMAY K. SHAH whose telephone number is (571)270-3624. The examiner can normally be reached on Mon-Thu (7:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TANMAY K SHAH/
Examiner, Art Unit 2611

/David C. Payne/
Supervisory Patent Examiner, Art Unit 2611